

The Korean Species of the Intertidal Genus *Cafius* (Coleoptera, Staphylinidae, Staphylininae)

Mi-Jeong Jeon and Kee-Jeong Ahn*

(Department of Biology, Chungnam National University,
Daejeon City 305-764, Republic of Korea)

ABSTRACT

A taxonomic study of the genus *Cafius* Curtis in Korea is presented. The world-wide genus *Cafius* containing 45 species is restricted to seacoasts. Five species are recognized, three of which are reported for the first time in Korea [*C. algarum* (Sharp), *C. mimulus* (Sharp), *C. rufescens* Sharp]. A key, descriptions, and drawings of diagnostic characters of known Korean *Cafius* species are presented.

Key words: Staphylinidae, Staphylininae, *Cafius*, Intertidal, Taxonomy, Korea

INTRODUCTION

Members of the genus *Cafius* Curtis are restricted to seacoasts (Orth and Moore, 1980; Frank *et al.*, 1986; Hammond, 2000). They are characterized by the combination of: apical maxillary palpomere more or less fusiform or cylindrical; ligula entire, rounded or slightly sinuate apically; largest lateral macrosetal puncture of pronotum separated from lateral margin by about three times the width of the puncture or more; pronotal hypomeron without postcoxal process; mesosternum with acute intercoxal process; tarsal formula 5-5-5; outer edge of protibia with spines; protarsus in both sexes with basal four tarsomeres each bearing modified pale setae on ventral face and each almost always variably dilated.

The world-wide genus *Cafius* containing 45 species have been assigned to seven subgenera not based on phylogeny (Orth and Moore, 1980; Frank *et al.*, 1986; Herman 2001). Koch (1936)

* To whom correspondence should be addressed

Tel: 042-821-5492, Fax: 042-822-9690, E-mail: kjahn@cnu.ac.kr,

published a world revision. Blackwelder (1943) and Frank *et al.* (1986) studied the species of the West Indies. Coiffait (1974) published on the European and northern African species. Orth and Moore (1980) revised the species of the coasts of North America. Since Sharp (1874, 1888) described five new species in Japan, no revision of the *Cafius* has been presented in the Northeast Asian coasts.

In northern Korea [Cheongjin (Seishin)], *Cafius histrio* (Sharp) and *C. vestitus* (Sharp) have been reported by Koch (1936). While collecting intertidal staphylinids along the southern Korean coasts and working on collections from the various institutions, we recognized that these two species are common throughout the Korean coasts. In addition we found three species new to southern Korea. All five species are exclusively found under seaweeds on sandy beaches.

In this paper we report three intertidal *Cafius* species for the first time in Korea [*C. algarum* (Sharp), *C. mimulus* (Sharp), *C. rufescens* Sharp] and provide descriptions, illustrations of diagnostic features, and a key to the species of the *Cafius* in Korea.

MATERIALS AND METHODS

The terminology of taxonomic characters used in this study followed Orth and Moore (1980), and Smetana (1995). Materials for this study are deposited in the Chungnam National University Insect Collection, Daejeon City, Korea (CNUIC).

RESULTS

Cafius Curtis 바닷말반날개속 (신칭)

Cafius Curtis 1829, pp. 26, 245; Stephens 1829, p. 23; Thomson 1860, p. 152; Ganglbauer 1895, p. 462; Bernhauer and Scheerpeltz 1926, p. 361; Scheerpeltz 1933, p. 1368; Koch 1936, p. 180; Blackwelder 1952, p. 88; Moore and Legner 1975, p. 9; Shibata 1983, p. 132; Herman 2001, p. 2566.

Type species: *Staphylinus xantholoma* Gravenhorst.

Diagnosis. Body generally less elongate and not cylindrical, abdomen usually little longer than length of head through elytra. Mandible (Fig. 1C) large and stout. Maxillary and labial palps short, apical maxillary palpomere (Fig. 1B) more or less fusiform or cylindrical, not subulate, penultimate maxillary palpomere about 1.3 times as long as wide. Labial palps (Fig. 1D) short, palpomere 2 about as long as wide, apical labial palpomere not expanded, nor or scarcely wider than apical maxillary palpomere. Ligula entire, rounded or slightly sinuate apically. Largest lateral macrosetal puncture of pronotum separated from lateral margin by about 3 times the width of the puncture or more. Superior marginal line of pronotal hypomeron deflexed ventrad behind anterior pronotal angle and therefore not visible from above at anterior pronotal angle, often fused anteriorly to inferior marginal line of pronotal hypomeron. Pronotal hypomeron without postcoxal process. Mesosternum (Figs. 2A, B) with acute intercoxal process. Tarsal formula 5-5-5. Outer edge of protibia with spines. Protarsus in both sexes with basal 4 tarsomeres each bearing modified pale

setae on ventral face, in addition to regular unmodified marginal setae, and each almost always variably dilated (usually less so in female). Hind tarsus moderately long, basal tarsomere at least slightly longer than apical tarsomere. Abdominal sternite VIII of males (Fig. 1E) with rounded emargination. Restricted to beaches.

Key to the species of the *Cafius* in Korea

1. Size small, less than 6.0 mm 2
- Size large, more than 7.0 mm 3
2. Body black, gular suture separated, mesosternum with transverse carina, concentration of setose glandular pores on abdominal sternites IV–V medially absent *C. algarum*
- Body red, dark brown, gular suture converged, mesosternal carina as in Fig. 2A, concentration of setose glandular pores on abdominal sternites IV–V medially present *C. rufescens*
3. Antennomeres all black, compound eyes large, ratio to tempora more than 0.6 4
- Antennomeres 6–11 brown, compound eyes small, ratio to tempora about 0.2 *C. mimulus*
4. Body surface shiny, punctures of head and pronotum large *C. histrio*
- Body surface dull, head and pronotum granulose *C. vestitus*

***Cafius algarum* (Sharp) 쇠바닷말반날개 (신칭) (Figs. 3A, B)**

Philonthus algarum Sharp 1874, p. 38.

Cafius algarum: Scheerpeltz 1933, p. 1369; Adachi 1957, p. 182; Shibata 1983, p. 133; Herman 2001, p. 2569.

Material examined. 1♀, Jeju Prov., Seoguiipo City, 4 May. 1985, K. S. Lee; 1♀, 22 Oct. 1985, K. S. Lee; 1♀, 24 Oct. 1985, K. S. Lee; 1♀, 12 Dec. 1985, K. S. Lee; 2♀♀, Donneko, 22 Oct. 1985, K. S. Lee; 1♀, Yongduam, 2 July 1991, K. J. Ahn; 1♀, Gangwon Prov., Jangho beach, 5 July 1991, K. J. Ahn; 1♀, Mangsang beach, 5 July 1991, K. J. Ahn; 22♂♂, 17♀♀, Gosung-gun, Bongpo, 13 Sep. 1998, K. J. Ahn; 2♂♂, 4♀♀, Gyeongbuk Prov., Kugae, 6 July 1991, K. J. Ahn; 1♂, Kuryongpo, 6 July 1991, K. J. Ahn; 1♀, Chungnam Prov., Taean-gun, Shinjindo Isl., 1 May 1998, Y. B. Cho; 3♂♂, Jeonnam Prov., Bosung-gun, Hoichun-myeon, Dongryul-ri, Yulpo beach, ? 2000, K. J. Ahn, H. J. Kim, M. J. Jeon; 9♂♂, 8♀♀, Jindo, Imhoe-myeon, Geumgab beach, 22 Aug. 2001, K. J. Ahn, J. H. Ahn, S. J. Park, C. W. Shin, and M. J. Jeon.

Description. Length 4.5–5.5 mm. Body black; antennae, mouthparts, legs dark brown to brown. Head about 1.05 times as wide as long; as wide as pronotum; punctures large, umbilicate, impunctate centrally; relatively long setae densely distributed. Gular suture separated. Antennae longer than head and pronotum combined; antennomeres 1–3 glabrous, 4–5 elongate, 6–7 subquadrate, 8–10 transverse. Eyes large, ratio of eye length to tempora about 0.59. Pronotum 0.89 times as wide as long; widest at apical angle, narrowed posteriad, apical and basal margins round, lateral margins slightly sinuate; relatively long and dense setae directed laterally; impunctate central region slightly elevated. Mesosternum with transverse carina. Elytra wider than pronotum; densely pubescent, setae directed posteriorly. Abdomen densely pubescent, setae directed posteriorly. Aedeagus as in Figs. 3A, B.

Distribution. Korea, Japan.

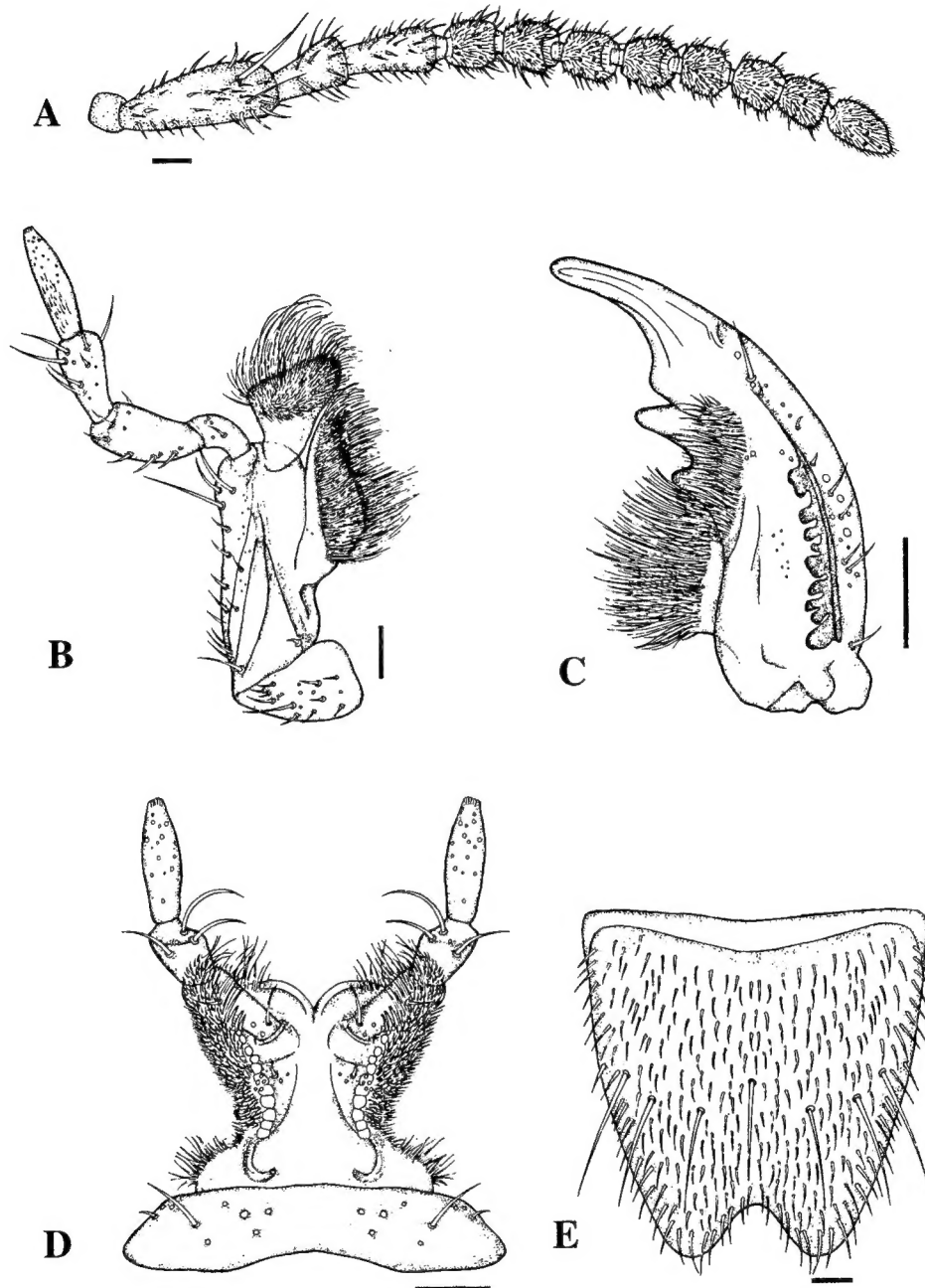


Fig. 1. *C. vestitus*. A, antenna, dorsal aspect; B, maxilla, dorsal aspect; C, mandible, dorsal aspect; D, labium, dorsal aspect; E, male tergite VIII, dorsal aspect. Scale = 0.1 mm.

Remarks. This species is the smallest in Korea. Therefore, they are easily distinguished from other species by size.

Cafius histrio* (Sharp) 바닷말반날개 (신칭) (Figs. 2B, 3C, D)Philonthus histrio* Sharp 1874, p. 37.*Cafius histrio*: Scheerpeltz 1933, p. 1369; Koch 1936, p. 191; Adachi 1957, p. 182; Shibata 1983, p. 134; Herman 2001, p. 2573.

Material examined. 3♂♂, 1♀, Jeju Prov., Seoguipo City, 12 July 1985, K. S. Lee; 1♂, 13 July 1985, K. S. Lee; 1♂, 3♀♀, 12 Sep. 1985, K. S. Lee; 10♂♂, 11♀♀, 22 Oct. 1985, K. S. Lee; 5♂♂, 3♀♀, 24 Oct. 1985, K. S. Lee; 1♂, 4 Dec. 1985, K. S. Lee; 1♂, 3♀♀, 12 Dec. 1985, K. S. Lee; 1♂, 1♀, Donneko, 22 Oct. 1985, K. S. Lee; 1♂, Yongduam, 2 July 1991, K. J. Ahn; 1♀, Pyoseon Beach, 2 July 1991, K. J. Ahn; 1♀, Gwangji Beach, 3 July 1991, K. J. Ahn; 3♂♂, 1♀, Chungnam Prov., Taeon-gun, Shinjindo Isl., 1 May. 1998, Y. B. Cho; 1♂, 1, Korea, Gangwon Prov., Mangsang Beach, 5 July 1991, K. J. Ahn; 1♂, Gyeongbuk Prov., Kugae, 6 July 1991, K. J. Ahn; 3♂♂, 2♀♀, Gyeongnam Prov., Changwonkun, Simri, 21 July 1991, K. J. Ahn; 3♂♂, 4♀♀, Geoje, Gabaeri, Korea Marine Biological Laboratory, 30 July 1998, K. J. Ahn, J. H. Ahn, H. J. Kim, and J. Y. Ryu; 1♂, 2 June 1998, K. J. Ahn; 2♀♀, 1 June 2000, K. J. Ahn, H. J. Kim, and M. J. Jeon; 1♀, Gangwon Prov., Goseong-gun, Bongpo, 13 Sep. 1998, K. J. Ahn; 2♂♂, Jeonnam Prov., Jindo, Imhoe-myeon, 22 Aug. 2001, K. J. Ahn, J. H. Ahn, S. J. Park, C. W. Shin, and M. J. Jeon.

Description. Length 7.0–8.5 mm. Body black to dark brown. Head about 1.03 times as wide as long; as wide as pronotum; punctures large, umbilicate, impunctate centrally; relatively long setae densely distributed. Antennae reached to posterior margin of pronotum; antennomeres 1–3 glabrous, 4–8 elongate, 9–10 subquadrate. Eyes large, ratio of eye length to tempora about 0.66. Pronotum 0.89 times as wide as long; widest at apical angle, narrowed posteriad, apical and basal margins round, lateral margins slightly sinuate; relatively long and dense setae directed laterally; punctures large, umbilicate; impunctate central region slightly elevated. Mesosternum (Fig. 2B) with

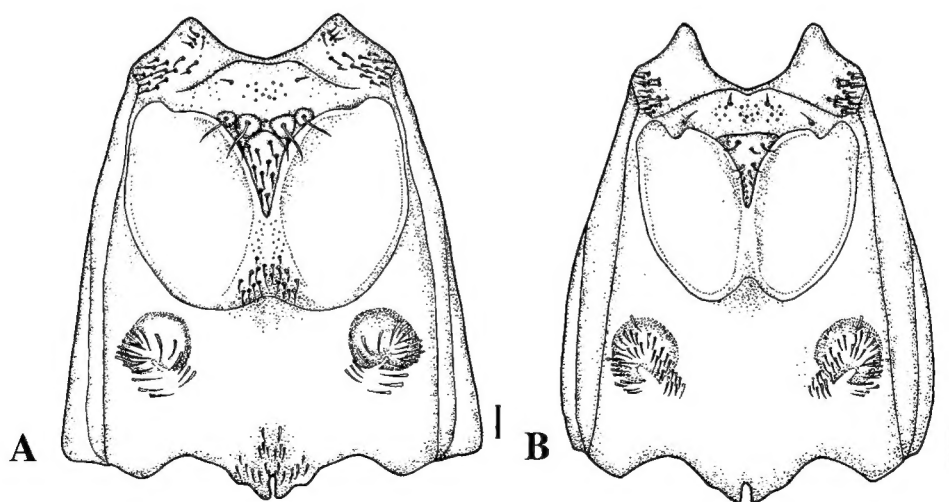


Fig. 2. Mesosternum, dorsal aspect. A, *C. rufescens*; B, *C. histrio*. Scale = 0.1 mm.

transverse carina. Elytra wider than pronotum; densely pubescent, setae directed posteriorly. Abdomen densely pubescent, setae directed posteriorly. Aedeagus as in Figs. 3C, D.

Distribution. Korea, Japan, China, Hong Kong.

***Cafius mimulus* (Sharp) 좀눈바닷말반날개 (신칭) (Fig. 3E, F)**

Philonthus mimulus Sharp 1874, p. 38.

Cafius mimulus: Scheerpeltz 1933, p. 1370; Adachi 1957, p. 182; Shibata 1983, p. 134; Herman 2001, p. 2574.

Material examined. 8♂♂, 11♀♀, 1, Gyeongnam Prov., Geoje, Gabaeri, Korea Marine Biological Laboratory, 30 July 1998, K. J. Ahn, J. H. Ahn, H. J. Kim, and J. Y. Ryu; 1♂, 2♀♀, 29 July 1998, K. J. Ahn, J. H. Ahn; 3♀♀, 2 June 1998, H. J. Kim; 1♀, 2 June 1998, K. J. Ahn; 1, 29 July 2000, M. J. Jeon; 2♂♂, 1♀, Gudo, 30 July 1998, K. J. Ahn, J. H. Ahn; 1♂, 1♀, Gabaeri, 30 June 1999, K. J. Ahn; 2♂♂, Dongbu-myeon, 30 June 1999, W. S. Hwang.

Description. Length 7.0–9.0 mm. Body black, antennomere 4–5 dark brown, 6–11 brown. Head about 1.06 times as wide as long; as wide as pronotum; punctures large, umbilicate, impunctate centrally; relatively long setae densely distributed. Antennae shorter than head and pronotum combined; antennomeres 1–3 glabrous, all elongate. Eyes small, ratio of eye length to tempora about 0.20. Pronotum about 0.89 times as wide as long; widest at apical angle, narrowed posteriorly, apical and basal margins round, lateral margins slightly sinuate; relatively long and dense setae directed laterally; punctures large, umbilicate; impunctate central region slightly elevated. Mesosternum with transverse carina. Elytra wider than pronotum; densely pubescent, setae directed posteriorly. Abdomen densely pubescent, setae directed posteriorly. Abdominal sternite III with broad V-shaped carina. Aedeagus as in Figs. 3E, F.

Distribution. Korea, Japan.

***Cafius rufescens* Sharp 빨강바닷말반날개 (신칭) (Figs. 2A, 3G, H)**

Cafius rufescens Sharp 1888, p. 44; Scheerpeltz 1933, p. 1370; Adachi 1957, p. 182; Shibata 1983, p. 136; Herman 2001, p. 2577.

Material examined. 1♂, 1♀, Gangwon Prov., Donghae, Mangsang beach, 27 July 1981, C. G. Choi; 4♂♂, 6♀♀, Jeju Prov., Iho beach, 2 July 1991, K. J. Ahn; 1♂, 2♀♀, Hamdeok beach, 2 July 1991, K. J. Ahn; 2♂♂, 1♀, Pyoseon beach, 2 July 1991, K. J. Ahn; 1♂, 2♀♀, Gwangji beach, 3 July 1991, K. J. Ahn; 1♂, Hyopjae beach, 3 July 1991, K. J. Ahn; 1♀, Namjeju-gun, Seongsan-eub, Seongsanpo, Ilchulbong, 9 Aug. 2000, Y. B. Cho; 28♂♂, 27♀♀, Gangwon Prov., Mangsang beach, 5 July 1991, K. J. Ahn; 7♂♂, 20♀♀, Goseong-gun, Bongpo, 13 Sep. 1998, K. J. Ahn; 5♂♂, 7♀♀, Gyeongbuk Prov., Guryongpo, 6 July 1991, K. J. Ahn; 1♀, Kugae, 6 July 1991, K. J. Ahn; 1♂, 2♀♀, Chungnam Prov., Taean-gun, Shinjindo, 1 May 1998, Y. B. Cho; 6♂♂, 10♀♀, Jeonnam Prov., Bosung-gun, Hoichun-myeon, Dongryul-ri, Yulpo beach, ? 2000, K. J. Ahn, H. J. Kim, M. J. Jeon; 33♂♂, 28♀♀, Jindo, Imhoe-myeon, Geumgab beach, 22 Aug. 2001, K. J. Ahn, J. H. Ahn, S. J. Park, C. W. Shin, M. J. Jeon; 36♂♂, 34♀♀, Wando, Sinji-myeon, Myeongsasimri beach, 23 Aug. 2001, K. J. Ahn, J. H. Ahn.

Description. Length 5.0–6.0 mm. Head black, pronotum blackish brown, elytra, abdomen, legs dark reddish brown. Head about 0.96 times as wide as long, not enlarged behind eyes; as wide as

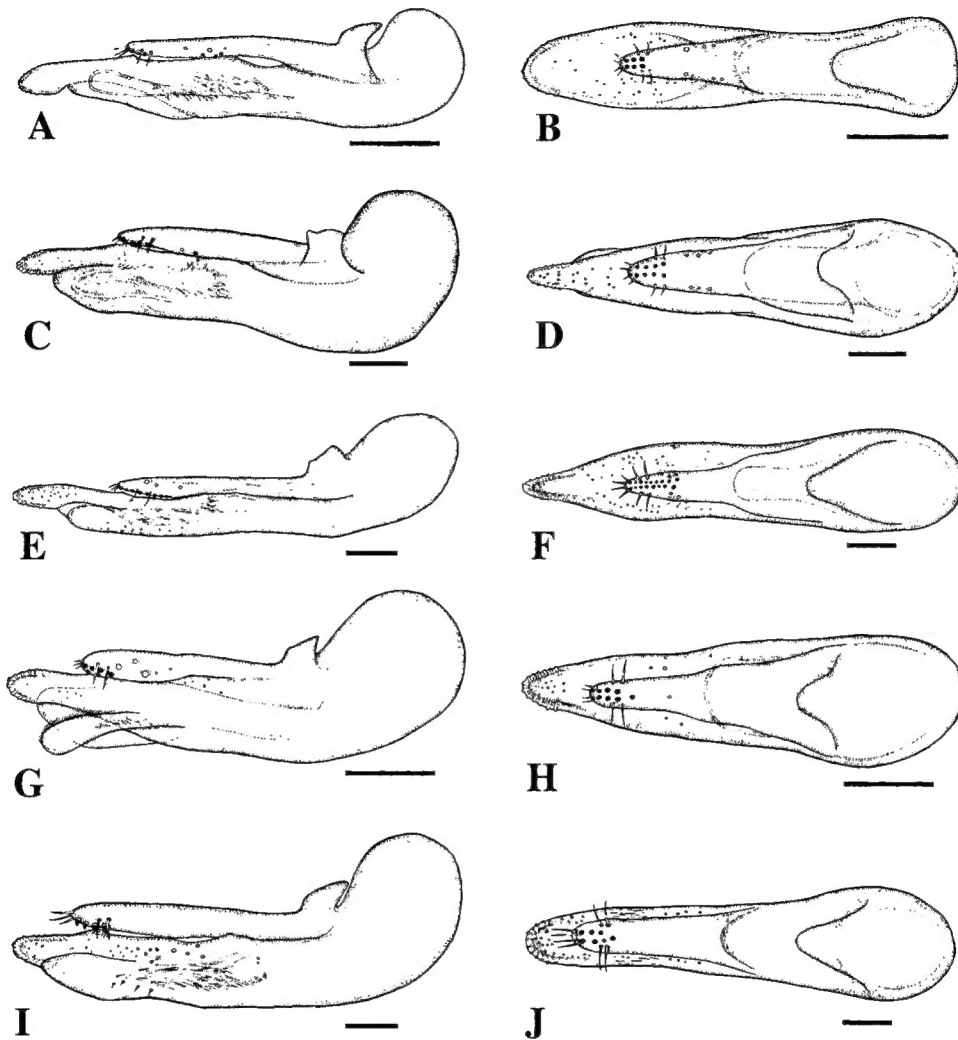


Fig. 3. Aedeagus. A, B, *C. algarum*; C, D, *C. histrio*; E, F, *C. mimulus*; G, H, *C. rufescens*; I, J, *C. vestitus*; A, C, E, G, I, lateral aspect; B, D, F, H, J, ventral aspect. Scale = 0.1 mm.

pronotum; punctures large, umblicate, impunctate centrally; relatively long setae densely distributed. Antennae reached to posterior margin of pronotum; antennomeres 1-3 glabrous, 4 subquadrate, 5-10 transverse. Eyes large, ratio of eye length to tempora about 0.77. Pronotum about 0.87 times as wide as long; almost parallel, apical and basal margins round, punctures umblicate, surface granulate; impunctate central region slightly elevated. Mesosternal carina as in Fig. 2A. Elytra wider than pronotum; densely pubescent, setae directed posteriorly. Abdomen densely pubescent, setae directed posteriorly. Abdominal sternites IV-V with medial concentration of setose glandular pores. Aedeagus as in Figs. 3E, F.

Distribution. Korea, Japan, Hong Kong.

Remarks. Sharp (1888) mentioned that this species had male secondary sexual characteristics of abdominal sternites IV-V with medial setose pores. However, our anatomical study revealed that females also contain the characters.

***Cafius vestitus* (Sharp) 검둥바닷말반날개 (신칭) (Figs. 1A-E, 3I, J)**

Philonthus vestitus Sharp 1874, p. 37.

Cafius vestitus: Scheerpeltz 1933, p. 1370; Koch 1936, p. 189; Adachi 1957, p. 182; Shibata 1983, p. 1136; Herman 2001, p. 2579.

Material examined. 1♀, Jeju Prov., Seoguiipo City, 17 Dec. 1985, K. S. Lee; 2♂♂, 1♀, Pyoseon beach, 2 July. 1991, K. J. Ahn; 2♂♂, 1♀, Namjeju-gun, Daejeong-eub, Moseulpo beach, 8 Aug. 2000, Y. B. Cho; 1♂, 1♀, Seongsan-eub, Seongsanpo, 8 Aug. 2000, Y. B. Cho; 1♀, Gangwon Prov., Jangho beach, 5 July 1991, K. J. Ahn; 4♂♂, 5♀♀, 1, Goseong-gun, Bongpo, 13 Sep. 1998, K. J. Ahn; 2♂♂, Korea, Gyeongnam Prov., Geoje city, Gabae-ri, 1 June. 2000, K. J. Ahn, H. J. Kim, and M. J. Jeon; 13♂♂, 15♀♀, Jeonnam Prov., Jindo, Imhoe-myeon, Geumgab beach, 22 Aug. 2001, K. J. Ahn, J. H. Ahn, S. J. Park, C. W. Shin, and M. J. Jeon; 2♂♂, 2♀♀, Wando, Sinji-myeon, Myeongsasimri beach, 23 Aug. 2001, K. J. Ahn, J. H. Ahn.

Description. Length 7.5-9.0 mm. Body black, surface dull, head and pronotum granulose. Head about 0.88 times as wide as long; as wide as pronotum; punctures large, umblicate, impunctate centrally; relatively long setae densely distributed. Antennae (Fig. 1A) longer than head and pronotum combined; antennomeres 1-3 glabrous, 4-5 quadrate, 6-7 subquadrate, 8-10 transverse. Eyes very large, ratio of eye length to tempora about 0.87. Pronotum about 0.87 times as wide as long; widest at apical angle, narrowed posteriad, apical and basal margins round, lateral margins with several long macro setae slightly sinuate; relatively long and dense setae directed laterally; impunctate central region slightly elevated. Mesosternum with transverse carina. Elytra wider than pronotum; densely pubescent, setae directed posteriorly. Abdomen densely pubescent, setae directed posteriorly. Aedeagus as in Figs. 3I, J.

Distribution. Korea, Japan.

Remarks. This species is very similar to *C. histrio*. In addition to the characters presented in the key, they can be recognized by the presence of much more pubescence on elytra and abdomen compared with *C. histrio*.

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한국산 바닷말반날개속 (딱정벌레목, 반날개과, 반날개아과)의 분류학적 연구

전 미 정 · 안 기 정
(충남대학교 생물학과)

요 약

한국산 바닷말반날개속 (*Cafius*)의 분류학적 연구를 수행하였다. 전세계에 45종이 분포하며 모두 바닷가에서 발견된다. 국내에서 처음으로 기록되는 3종 [*C. algarum* (Sharp), *C. mimulus* (Sharp), *C. rufescens* Sharp]을 포함하여 5종을 보고한다. 이들의 검색표, 기재, 주요형질의 그림을 제시하였다.